

New Meteorological and Geological Study of Taviano (LE)

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Abstract

This paper contains the result of the elaboration of informations about Solar Irradiation, Geological, Meteorological and Climatic from the point of view of the quantitative data and social interaction recorded in Taviano (LE) over 24 years. These data are compared to check local variations, long term trends, and correlation with mean annual temperature. The ultimate goal of this work is to understand long term climatic changes in this geographic area. The classes of event considered are hydro-geological phenomena, sun irradiation, seismic, volcanic, meteorological and climatological event. Only event occurred between 1990 and 2014 are considered. The analysis is performed using a statistical approach. A particular care is used to minimize any effect due to prejudices in case of lack of data. Finally, we calculate the annual average from the monthly ones. Data on this paper don't come from a complete census of phenomena; they are considered enough representative of the accepted vulnerability level at the beginning of this study.

Keyword: atmospheric effects - site testing - ground-failures - landslides - flood - earthquake - damages - Taviano - methods: statistical.

This paper was prepared with the L^AT_EX

1 Introduction

In this paper we present for the first time an analysis of geological, meteorological and climatic data revealed in Taviano (LE)

by “SMCS - Stazione Meteo-Climatica e Sismologica” a project by Meteorological and Climatic Change and Geological Department of TS Corporation Srl.[1] compared in order to check local variations or

meteorological conditions. We discuss the geological data, annual temperature means and differences between day time and night time mean values and their comparison with the down time.

1.1 Location

Taviano is a little town in the south of Italy. Here are identifiable altimeter data, the geographic coordinates and seismic data.

Latitude	Longitude	Share
39°59'4,20" N	18°5'15,36" E	57 mt

Geographic Data of Taviano

The geological map of the town is shown in Geological and Seismic data section. [6]

Seismic Zone	Description
4	Area with very low seismic danger. is the least dangerous area, where the possibility of seismic damage is low. The area has a value of ag < 0,05g.

Seismic Data of Taviano

1.2 Mancaversa beach

Taviano has a portion of its territory that borders the Ionian Sea. The place called "Marina di Mancaversa" is located on the Ionian coast about 5 km from the center of Taviano. The coast is mostly rocky and 900 meters long.

2 Annual data analysis

The following table identifies climate data assigned by Decree of the President of the Republic n. 412 of 26 August 1993.[2].

Climatic Zone	Day Degrees
C	1.099

Climatic Parameter of Taviano

3 Meteo-Climatic Parameter

In this section we describe air temperatures (T), Dew Point, Humidity, Pressure, Day Time and Night Time Variation, Rain's

Days and Fog's Day, obtained by an accurate analysis of the meteorological data from local data by archive [3] [4].

Should be noted that the values considered are related to the last twenty-four-year average and made available for the period 1990-2014.

Average Annual Temperature	16,76°C
T average warmest (Jul-12)	28,16°C
T average coldest (Feb-12)	4,43°C
Annual temperature range	9,90°C
Months with average T > 20°C	104
Total rainfall 1990-2014 [mm]	16003,70
Rain Days	1092
Fog Days	770
Storm Days	188
Rain/Storm Days	595
Rain/Snow Days	11
Rain/Fog Days	45
Rain/Thunder/Fog Days	31
Snow Days	11
Wind Speed max Km/h (Mar-2002)	43,45
Wind Speed min Km/h (Nov-2010)	6,00
Rain max mm (Oct-2004)	343,00
Rain min mm (Aug-2000)	0,00
Earthquake Min (2011/12/20)	0,5 Mw
Earthquake Max (2006/07/06)	2,4 Mw
Earthquake Deep Min (2012/08/21)	5 Km
Earthquake Deep Max (2010/04/28)	10 Km

Parameter of this Study

3.1 Solar Radiation Territory

The data irradiation of territory taken from the parameters and the data prepared by the European Union, demonstrate the trend of irradiation for Taviano, visible in next table:

Month	DNI	Month	DNI
Jan	3310	Feb	3980
Mar	5350	Apr	6390
May	7570	Jun	9040
Jul	9410	Aug	8680
Sep	6470	Oct	5100
Nov	3820	Dec	3220
Year	6040		

Direct Normal Irradiance (Wh/m²/day)

The weather data and the graphs show extrapolated for the territory covered by the study, including a radiation in the range between 1350 and 1400 kWh /kWp as map prepared by the European Union [8] and visible in figure 19, characterized in over the months, irradiation presented in the graph in Figure 19, which shows the data of the table above, which shows the territory of Taviano, a total irradiance Annual of 6040 Wh/m²/day.

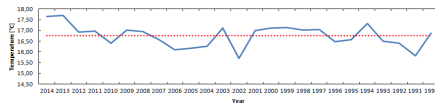
3.2 Temperature

In this section we describe air temperatures (T) obtained by an accurate analysis of the meteorological data.

The average temperature shows a tendency to intersperse over 4 years, an increase and a decrease in the average the study period 1990-2014.

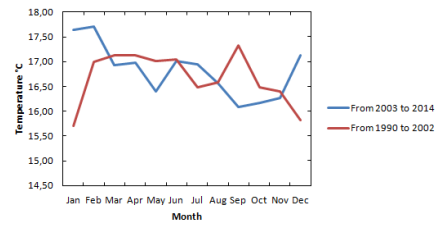
The period of greatest temperature increase has occurred since 2010, with an increasing trend of about 1°, while the greater decrease for the period of study has taken place in 2002.

At the turn of these periods, the study highlights a trend in rising and then held constant for the period between 1996 and 2001, with a trend down slightly in 2004-2006. Next graphics show this evidence:



Relationship of Year Temperature and Average 1990-2014.

The values are calculated considering the entire measurement period (1990-2014), drawing on data from the Annuals published by "Il Meteo.it" [3] and Eumetsat [4] for the period 1990-2014.



Variation of Month Temperature about year 1990-2002 and 2003-2014

The graphs shown in Figures 4 and 5 show the performance of the maximum and minimum temperatures proportional to the average of the period of study (1990-2014). The study shows the following trends:

- Minimum temperatures: there was an increase of the values recorded with a higher peak in February 2012, with 4,43°C;
- Maximum temperatures: evidence for the period 2007-2009 is an increasing trend compared to the 1990-2014 average, while evidence a decrease in the period 1990-1997. The maximum temperature was 28.16°C in July 2012.

Table 5 shows the trend of the points of maximum temperature expected in the summer quarter (June-July-August) and are shown in Figure 15. Study shows that the month of July 2012 recorded the highest average maximum value in a context in which the entire month recorded in the period 1990-2014 values always above average.

Alway Table 5 shows the trend of the points of minimum temperature expected in the winter quarter (January-February-March) and are shown in Figure 16.

Study shows that the month of February recorded the highest average minimum value, in a context in which the entire month recorded in the period 1990-2014 values always above average.

Studying in particular the months with the values of minimum temperature and maximum minors, the following is noted:

- the month of July (characterized by the presence of the highest value observed in maximum temperatures), shows that trends in temperature has been getting consistently below average for the period 1990 to 2014, while there were two exceedances of this value over the years 2012 and 1998, in agreement with what evident from the graph in Figure 13;
- the month of February (characterization from the value of the lowest minimum temperature for the period of study), shows that the trend of temperatures has always been, in agreement with what reported in the graph in Figure 14.

3.3 Dew point

In this section we describe Dew point obtained by an accurate analysis of the meteorological data. This study showed:

- an increase in the year: 1992, 1993, 1994 (the highest Dew Point period for this study), 1995, 1998, 1999, 2013 and 2014;
- a decrease in rest of study period, with the lowest Dew Point in 2008 year.

Graphics in Figure 11 show this trend.

3.4 Humidity

In this section we describe humidity obtained by an accurate analysis of the meteorological data. The study highlights a gap in the annual humidity values equal to 69,38%, calculated according to this formula:

$$\frac{av}{am} \quad (1)$$

av = annual value, *am* = average moisture 1990-2014

The graph in Figure 9 shows a trend tends to be stable in the values obtained with threshold in growth over the period

1990,1991, 1992,1993,1994 (the highest Humidity point for this study),1995,1996 and 2014, in rest of study period, with the lowest in 2008 year.

3.5 Pressure

In this section we describe pressure obtained by an accurate analysis of the Pressure data.

The analysis of the data showed:

- an increase in atmospheric pressure over the years: 2000, 2004 (year with the highest level of pressure throughout the study period), 2007, 2008, and 2011;
- a decrease in atmospheric pressure in rest of study period, with the lowest data in 2010 (the year with the last level of pressure throughout the study period).

In Figure 10 we can see the Pressure Graphics for this study.

3.6 Day time and night time variation

In this section we describe number of Day time and night time variations obtained by an accurate analysis of the meteorological data. The annual averages of the differences between day time and night time temperatures ΔT have been computed and the results are reported in Table 2. Also in Figure 3, we can see the plot of oscillations of the ΔT seem to reduce the amplitude during the years.

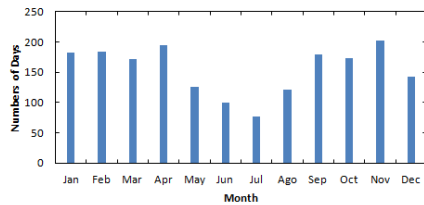
The difference of temperatures, with an average difference of 9,90°C (see table 2). Table 2 and Figure 3 show these effects.

3.7 Rain's Days

In this section we describe number of Rain's days obtained by an accurate analysis of the meteorological data.

An increase in extreme weather events and abnormal, leading to a potential increase

in precipitation intensity for each event, especially in areas where there is an increase of average precipitation.

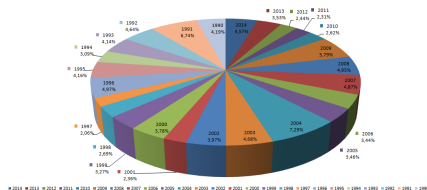


Days Rain for Month from 1990 to 2014.

The study period showed an abnormal increase in rainfall. The pie chart shows the ratio between the total mm of rain measured in a year and the total rainfall measured in the period 1990-2014, according to this formula:

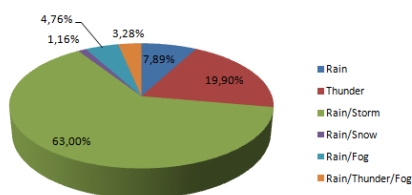
$$TotalRain = \frac{a}{b} \times 100 \quad (2)$$

a = annual rainfall value, **b** = total value of the rain period



% of Rain for this study.

In Figure 6 and 7 we can see the total of rain/year in this study. The values are visible in the table 3. Next pie chart evidence type of rain for this study.



Type of Rain for this study.

Figure 17 evidence the total rain in mm, for only month.

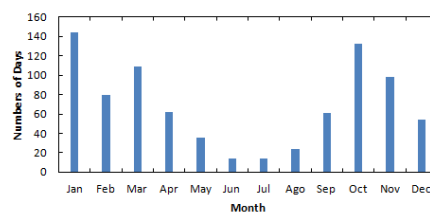
The study shows an abnormal increase in rains, shown in Figure 7, in the years: 2014, 2009, 2008, 2007, 2004 (the highest

year period mm of rain fell), 2003, 1996, 1992, 1991, with an average increase of 134.71% of the total annual rainfall mm which is equal to 640.15 mm on average for year.

3.8 Fog's days

In this section we describe number of Fog's days obtained by an accurate analysis of the meteorological data.

The study showed a trend increase in the presence of days with fog and evidence that January is the first month for number of Fog's day and June and July are the laster. Figure 8 we can see the number of Fog days by this study.



Days Fog for Month from 1990 to 2014

3.9 Wind speed

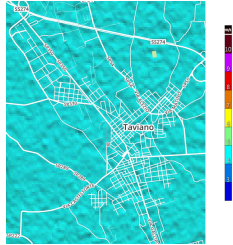
In this section we describe the wind speed. In the above image you can see the map of wind speed insistent on the territory of Taviano, as seen from the map generated from Atlas wind [5].

The study of daily wind speed has allowed to estimate on a monthly basis throughout the period included in this study:

- a decrease in the average for the period 1990-2014 in the speed of the winds, with values of 6 Km/h in November 2010;
- an increase with higher gusts, in high winds, especially in the period between the autumn and winter, with values of 43,45 Km/h in March 2002.

The study also shows that the month of March is the one with the trend towards

greater variation in the wind speed, as well it appears from the comparison chart, maximum and minimum wind speed for this study shown in Figure 12.



Wind Speed Atlant of Taviano [5]

4 Geological and Earthquake data

In this section we describe the Geological and Earthquake data.

The reconstruction of the geologic and lithological was made according to the study of aerial photographs, the interpretation of the stratigraphic wells, and finally on the basis of a detailed geological survey. The town of Taviano is placed at a modest slope topographic oscillating for 0° of the seaside town of Mancaversa, to 58° of the municipality itself.

The current geological configuration was formed by tectonic distension that affected the basement carbonate during the service sector and that has created a series of depressions, where Pleistocene sedimentary sequences currently present, have been placed in succession. The formations are present consist mainly of Plio-Pleistocene sandy-arenaric and/or calcarenitic, resting on clay deposits.

4.1 Description of the main outcrop formations

The rocks outcropping in the territory of Taviano are:

- Limestones Melissano: this training which is the base on which rest the next, shows stratification variables to undulating, with subvertical fractures, with diacalse and leptoclasia

structures with physical and mechanical secondary due to the action of karst. The lithology shows a brown or hazel color, compact, in layers and benches, alternating levels of gray or hazel;

- Calcareniti of Salento: this training is based on the previous, derives from the accumulation of materials derived from erosion of the greenhouses of which was made the previous base. The lithology shows a gray yellow light and compact, coarse limestone and calcareous sabbioni, more properly defined in the terminology "Tufi".
- Formation of Gallipoli: the formation of Gallipoli is constituted by two fundamental rock types which are:
 - The marl clay at the base: they have a bluish-gray tint, are less stratified and contain varying percentages of fragments quazo sharp edges;
 - The sandy marl at the top of the above: constituent layers well defined, have a yellowish tint or gray-yellowish, have a clay content, and mainly consist of fragments of quartz grain medium / fine.

This formation is constituted by two lithological units that are sands and clays outcropping gray-blue, present in depth. The clays in question, correlate well, both from the point of view lithological that stratigraphic, subappenine Plio-Pleistocene clays or clay gray-blue Calabrian, found in different areas of Puglia, from The board at the end murgiana Fossa, the Murge and the Salento. Basically the characters of these clays are largely comparable along all areas of outcrop.

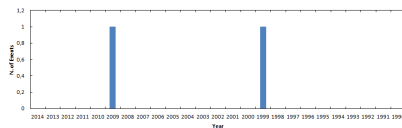
Stratigraphically, they are placed

in the middle part of the sedimentary cycle Pliocene-Pleistocene. They are based, in continuity of sedimentation on calcareniti plio-pleistoceniche (Calcareniti Gravina). Pass upwardly gradually, in general, to deposits sandy or calcarenitic calabrian, constituting the terms of closure of said Cycle.

4.2 Earthquake

This study evidence an stability of Earthquake activity for Taviano.

In next figure we can see the number of Earthquake in Taviano, and table evidence the number of Earthquake event by year.

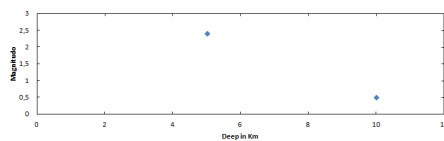


Number of Earthquake for 1990 to 2014

Year	N. of Events	Year	N. of Events
2009	1	1999	1

Number of Earthquake in Taviano by Year

The study evidence that the 2 Earthquake are production on deep from 5 to 10 Km. Next graphics evidence this.



Magnitudo/Deep for 1990 to 2014

5 Conclusion

We presented for the first time an analysis of geological and longterm temperature data directly obtained from Taviano local meteorological site, inside urban concentration and well above the inversion layer. From a meteorological perspective Taviano falling within the territory of the southern Salento which it has a Mediterranean climate, with mild winters and summers warm moist.

According to the reference averages, the average temperature of the month coldest, February, amounts to about $+4,43^{\circ}\text{C}$, while that of the warmest month, July, is about $+28,16^{\circ}\text{C}$.

Average annual rainfall, who prowl around 640,15 mm, have a minimum in the spring-summer and a peak in autumn winter.

Based on data on wind, weakly affected western currents thanks to the protection given by the greenhouses salting that create a system to shield. Instead the current autumn and winter by South-East, aimed in part the increase in precipitation as well highlighted in the table of rain visible in section 3.7.

6 Acknowledgments

We would like to thank Silvia Gargano for his helpful suggestions, for his professionalism and for the support to make the paper more complete.

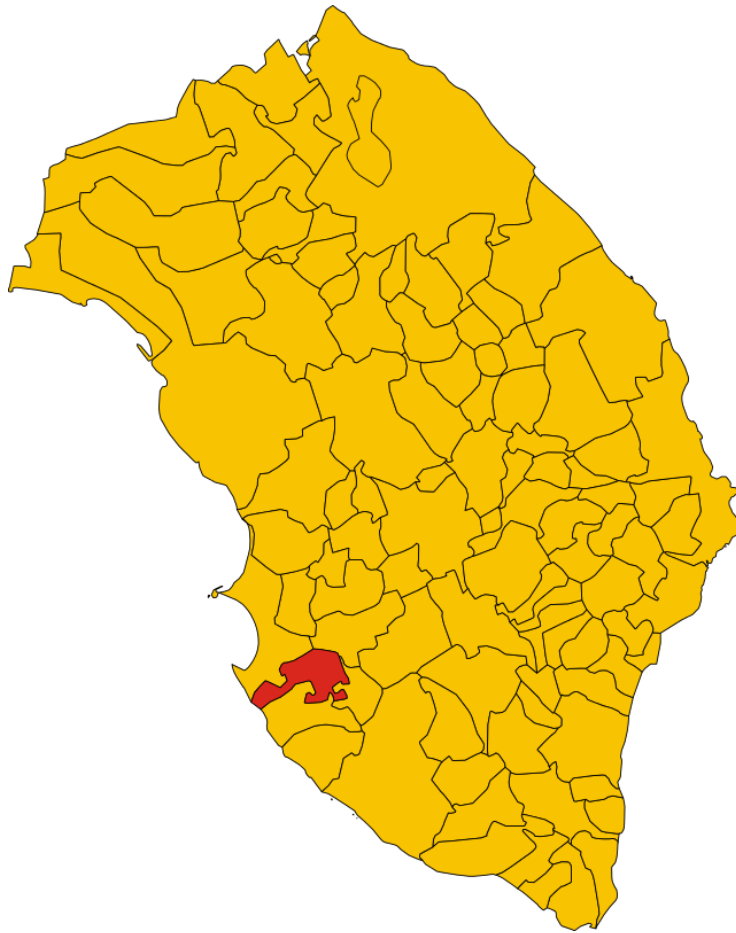


Figure 1: Identification of Taviano in the Lecce's province

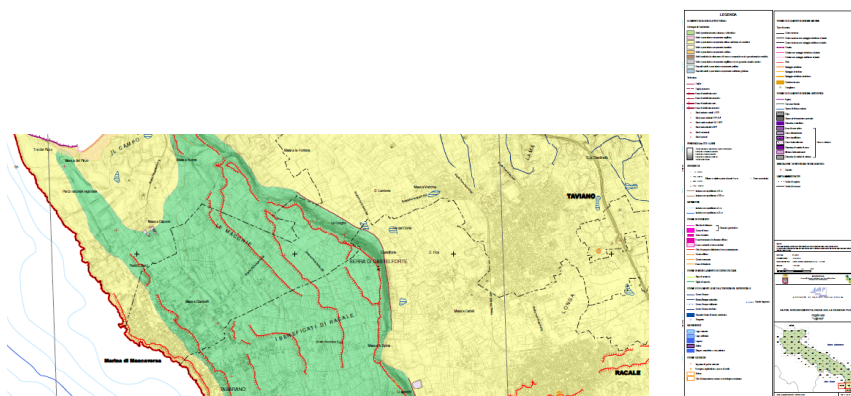


Figure 2: Geological Map of Taviano - LE [7]

Table 1: Comparison of temperature on decadal scale

Month	Year	Temperatures Min - Max	Month	Year	Temperatures Min - Max	Month	Year	Temperatures Min - Max
January	2014	2 - 16	February	2014	3 - 19	March	2014	4 - 22
	2013	0 - 17		2013	-3 - 18		2013	-1 - 20
	2012	-3 - 17		2012	-1 - 18		2012	2 - 20
	2011	-5 - 16		2011	0 - 17		2011	-2 - 19
	2010	1 - 19		2010	-1 - 19		2010	-1 - 20
	2009	0 - 16		2009	-2 - 16		2009	1 - 21
	2008	-2 - 18		2008	-2 - 19		2008	2 - 20
	2007	-2 - 21		2007	-2 - 18		2007	0 - 20
	2006	-6 - 16		2006	-4 - 20		2006	-2 - 22
	2005	-2 - 16		2005	-4 - 18		2005	-2 - 21
	2004	-3 - 17		2004	-2 - 18		2004	-2 - 21
	2003	1 - 19		2003	-3 - 16		2003	0 - 21
	2002	-3 - 16		2002	1 - 23		2002	2 - 23
	2001	1 - 18		2001	-2 - 18		2001	3 - 29
	2000	-3 - 17		2000	-2 - 17		2000	-1 - 20
	1999	-1 - 16		1999	-2 - 16		1999	2 - 20
	1998	1 - 17		1998	1 - 19		1998	-3 - 20
	1997	1 - 18		1997	-3 - 20		1997	1 - 21
	1996	-2 - 16		1996	-3 - 17		1996	-2 - 19
	1995	-1 - 19		1995	1 - 21		1995	2 - 19
April	1994	1 - 17	May	1994	1 - 17	June	1994	1 - 23
	1993	1 - 16		1993	-3 - 15		1993	1 - 21
	1992	-3 - 17		1992	-2 - 17		1992	0 - 18
	1991	-2 - 17		1991	-5 - 18		1991	4 - 22
	1990	-3 - 19		1990	0 - 19		1990	-2 - 24
	2014	3 - 23		2014	8 - 30		2014	14 - 35
	2013	7 - 30		2013	11 - 31		2013	14 - 36
	2012	4 - 27		2012	7 - 29		2012	15 - 36
	2011	5 - 25		2011	7 - 28		2011	15 - 35
	2010	5 - 24		2010	8 - 28		2010	11 - 35
	2009	6 - 24		2009	8 - 34		2009	14 - 35
	2008	4 - 24		2008	7 - 34		2008	15 - 34
	2007	0 - 25		2007	7 - 32		2007	11 - 44
	2006	2 - 26		2006	6 - 36		2006	10 - 40
	2005	0 - 26		2005	7 - 31		2005	7 - 38
	2004	3 - 23		2004	3 - 28		2004	11 - 36
	2003	-2 - 24		2003	9 - 33		2003	16 - 37
	2002	1 - 22		2002	7 - 26		2002	11 - 37
	2001	2 - 25		2001	8 - 34		2001	9 - 33
	2000	4 - 27		2000	11 - 31		2000	12 - 36
July	1999	3 - 29	August	1999	10 - 31	September	1999	11 - 35
	1998	2 - 24		1998	12 - 29		1998	16 - 37
	1997	-1 - 19		1997	6 - 31		1997	15 - 35
	1996	5 - 24		1996	11 - 28		1996	15 - 33
	1995	2 - 22		1995	7 - 30		1995	14 - 32
	1994	4 - 23		1994	9 - 32		1994	11 - 35
	1993	1 - 24		1993	7 - 31		1993	13 - 33
	1992	4 - 27		1992	8 - 29		1992	13 - 33
	1991	4 - 20		1991	5 - 26		1991	10 - 35
	1990	5 - 23		1990	7 - 32		1990	11 - 35
	2014	17 - 34		2014	16 - 38		2014	9 - 32
	2013	15 - 40		2013	19 - 38		2013	14 - 33
	2012	18 - 40		2012	16 - 38		2012	10 - 36
	2011	19 - 37		2011	17 - 37		2011	15 - 35
	2010	16 - 37		2010	2 - 36		2010	11 - 30
	2009	15 - 40		2009	18 - 35		2009	2 - 33
	2008	18 - 35		2008	17 - 39		2008	10 - 37
	2007	12 - 44		2007	15 - 40		2007	7 - 34
	2006	15 - 36		2006	10 - 39		2006	15 - 32
	2005	14 - 38		2005	11 - 38		2005	12 - 31
	2004	14 - 40		2004	11 - 37		2004	7 - 31
October	2003	16 - 40	November	2003	18 - 39	December	2003	16 - 33
	2002	16 - 37		2003	17 - 35		2003	7 - 29
	2001	15 - 37		2001	17 - 40		2001	10 - 32
	2000	14 - 41		2000	16 - 39		2000	9 - 34
	1999	16 - 34		1999	17 - 42		1999	16 - 31
	1998	17 - 42		1998	15 - 38		1998	11 - 31
	1997	15 - 39		1997	17 - 34		1997	11 - 32
	1996	13 - 36		1996	16 - 34		1996	9 - 27
	1995	17 - 37		1995	15 - 34		1995	11 - 29
	1994	18 - 37		1994	17 - 39		1994	13 - 37
	1993	10 - 40		1993	15 - 38		1993	11 - 32
	1992	14 - 33		1992	17 - 37		1992	10 - 33
	1991	16 - 36		1991	13 - 35		1991	13 - 31
	1990	16 - 38		1990	15 - 37		1990	9 - 34
	2014	7 - 27		2014	5 - 23		2014	-2 - 21
	2013	9 - 27		2013	2 - 25		2013	0 - 19
	2012	7 - 32		2012	7 - 24		2012	-2 - 18
	2011	3 - 28		2011	2 - 22		2011	-2 - 19
	2010	6 - 23		2010	4 - 23		2010	-3 - 20
	2009	6 - 27		2009	3 - 21		2009	-1 - 21
	2008	7 - 25		2008	2 - 24		2008	-2 - 18
	2007	3 - 29		2007	1 - 19		2007	-3 - 17
	2006	2 - 28		2006	-1 - 23		2006	-2 - 21
	2005	2 - 26		2005	6 - 22		2005	-5 - 18
	2004	10 - 28		2004	-2 - 25		2004	0 - 20
	2003	8 - 29		2003	5 - 23		2003	-2 - 19
	2002	5 - 25		2003	3 - 22		2003	-2 - 17
	2001	8 - 31		2001	1 - 24		2001	-5 - 17
	2000	7 - 28		2000	2 - 24		2000	-3 - 19
	1999	9 - 29		1999	1 - 22		1999	2 - 19
	1998	6 - 27		1998	1 - 23		1998	2 - 17
	1997	3 - 27		1997	7 - 22		1997	2 - 17
	1996	3 - 24		1996	5 - 22		1996	1 - 18
	1995	4 - 27		1995	1 - 21		1995	3 - 18
	1994	9 - 31		1994	3 - 23		1994	-2 - 19
	1993	8 - 28		1993	3 - 22		1993	2 - 19
	1992	10 - 27		1992	1 - 25		1992	0 - 20
	1991	5 - 33		1991	4 - 22		1991	-3 - 15
	1990	8 - 29		1990	2 - 27		1990	1 - 18

Table 2: Day Time and Night Time Variation

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2014	6	6	9	9	9	10	9	10	8	9	8	8
2013	7	7	6	11	9	11	11	10	10	9	7	10
2012	8	6	9	7	10	11	12	11	11	10	8	6
2011	8	8	7	10	9	9	10	11	10	8	9	8
2010	5	7	10	10	9	11	10	12	9	7	7	7
2009	6	7	8	8	11	9	11	11	10	8	7	6
2008	8	9	10	10	12	10	10	12	9	9	8	6
2007	11	8	10	13	13	14	15	14	12	9	7	7
2006	10	9	9	12	13	14	12	13	12	10	13	11
2005	9	10	11	11	12	12	13	13	10	10	11	8
2004	8	9	9	10	13	13	14	13	12	10	9	7
2003	8	9	11	10	12	14	13	14	11	9	7	7
2002	9	10	8	10	10	13	11	11	9	9	8	7
2001	8	10	11	10	11	12	13	13	11	11	8	7
2000	9	8	9	10	11	14	15	14	11	9	8	9
1999	8	7	8	9	11	10	11	13	9	9	7	6
1998	7	9	8	10	9	11	12	12	9	8	7	5
1997	6	10	9	8	10	10	12	9	9	8	6	6
1996	6	6	7	8	9	9	10	11	8	9	7	6
1995	7	8	8	9	9	8	10	8	9	10	7	5
1994	7	7	11	9	10	10	11	13	12	8	8	8
1993	8	6	9	14	19	23	25	27	22	19	13	12
1992	10	10	10	9	12	11	11	13	12	7	10	9
1991	9	8	8	9	11	14	12	12	11	8	9	8
1990	10	10	14	10	11	12	13	13	11	9	8	7
Average 1990-2014	7,94	8,20	9,13	9,89	11,19	11,80	12,23	12,55	10,62	9,42	8,31	7,51

Table 3: Rain/Year [mm]

Year		Jan	Feb	Mar	Apr	May	Jun	Jul	Ago	Sep	Oct	Nov	Dec	Tot	% Year
2014	58	55,00	88,00	67,00	100,00	60,00	55,00	30,00	10,00	100,00	45,00	50,00	71,00	731,00	4,57%
2013	46	60,00	90,00	55,00	20,00	25,00	20,00	55,00	45,00	50,00	30,00	95,00	20,00	565,00	3,53%
2012	24	20,00	60,00	15,00	60,00	20,00	5,00	5,00	5,00	45,00	75,00	35,00	45,00	390,00	2,44%
2011	33	25,00	45,00	45,00	35,00	55,00	50,00	0,00	10,00	35,00	20,00	35,00	15,00	370,00	2,31%
2010	31	55,00	55,00	25,00	40,00	15,00	30,00	25,00	0,00	50,00	65,00	40,00	20,00	420,00	2,62%
2009	98	279,00	36,50	95,70	72,60	40,40	180,00	10,00	68,10	55,00	40,00	40,00	10,00	927,30	5,79%
2008	59	58,20	32,70	87,90	17,00	49,50	2,00	3,10	139,20	43,70	67,50	246,40	44,20	791,40	4,95%
2007	71	13,10	42,60	141,60	38,60	58,80	31,60	0,50	45,00	183,50	138,90	57,10	27,40	778,70	4,87%
2006	46	25,70	80,90	46,30	34,90	74,10	72,20	72,20	10,00	80,70	10,00	42,70	0,50	550,20	3,44%
2005	46	65,40	59,80	57,10	46,00	29,70	2,00	25,20	101,00	67,30	34,60	34,60	31,40	554,10	3,46%
2004	97	70,70	32,30	168,70	44,60	119,10	3,10	98,10	23,10	94,70	343,00	133,60	35,60	1166,60	7,29%
2003	62	110,40	15,90	1,00	30,80	68,70	30,20	13,60	105,70	122,90	105,60	112,10	32,00	748,90	4,68%
2002	53	32,00	4,60	17,80	101,40	13,10	26,80	67,80	51,00	127,90	63,90	25,00	104,60	635,90	3,97%
2001	31	116,10	9,10	39,70	33,30	30,80	15,70	5,10	15,00	3,50	27,00	33,70	48,40	377,40	2,36%
2000	50	5,00	45,00	15,00	30,00	45,00	26,10	5,10	0,00	22,80	214,70	109,70	85,80	604,20	3,78%
1999	44	25,00	45,00	40,00	78,00	0,00	50,00	30,00	20,00	95,00	20,00	70,00	50,00	523,00	3,27%
1998	36	25,00	20,00	35,00	15,00	45,00	20,00	15,00	45,00	50,00	65,00	45,00	50,00	430,00	2,69%
1997	28	40,00	15,00	25,00	30,00	10,00	15,00	0,00	50,00	35,00	50,00	30,00	30,00	330,00	2,06%
1996	66	85,00	55,00	75,00	85,00	40,00	20,00	0,00	120,00	90,00	115,00	45,00	65,00	795,00	4,97%
1995	55	60,00	35,00	60,00	35,00	15,00	5,00	60,00	185,00	45,00	5,00	100,00	60,00	665,00	4,16%
1994	41	100,00	65,00	10,00	65,00	25,00	55,00	60,00	10,00	50,00	10,00	30,00	15,00	495,00	3,09%
1993	55	35,00	60,00	85,00	55,00	80,00	30,00	18,00	10,00	65,00	60,00	110,00	55,00	663,00	4,14%
1992	62	35,00	20,00	50,00	110,00	30,00	130,00	68,00	10,00	80,00	95,00	40,00	75,00	743,00	4,64%
1991	90	40,00	75,00	70,00	137,00	85,00	32,00	55,00	40,00	145,00	155,00	135,00	110,00	1079,00	6,74%
1990	56	15,00	10,00	35,00	80,00	80,00	20,00	5,00	50,00	25,00	120,00	175,00	120,00	670,00	4,19%
Average 1990-2014	53,56	58,02	43,90	54,51	55,77	44,57	37,07	29,07	46,72	70,48	76,41	72,60	51,04	16003,70	
														Year Average	640,15

Table 4: Wind Average[1990-2014]/Year on Km/h

Day	Jan	Feb	Mar	Apr	May	Jun	Jul	Ago	Sep	Oct	Nov	Dec	Average	Min	Max
1	24.91	24.21	32.44	24.08	19.48	22.86	23.44	25.35	25.42	24.00	22.13	25.56	24.49	19.48	32.44
2	21.13	26.68	28.33	24.28	20.91	22.52	24.92	21.87	22.65	20.71	24.61	23.60	23.52	20.71	28.33
3	24.13	26.32	27.71	25.84	28.44	23.64	20.83	21.92	22.27	25.83	25.58	23.84	24.70	20.83	28.44
4	25.54	28.12	30.22	26.80	26.64	25.26	21.96	23.08	24.23	24.21	26.00	22.32	25.36	21.96	30.22
5	25.08	26.48	30.60	28.63	24.24	22.13	23.35	27.22	28.79	21.71	26.21	23.13	25.63	21.71	30.60
6	26.68	29.36	29.88	29.08	21.71	24.68	23.83	25.00	24.17	19.40	27.75	25.04	25.55	19.40	29.88
7	24.21	27.88	24.44	26.44	25.17	24.87	24.84	23.57	20.59	25.52	27.13	23.70	24.86	20.59	27.88
8	22.84	26.36	29.68	27.13	23.42	24.26	29.12	22.95	23.87	25.50	21.96	23.70	25.07	21.96	29.68
9	22.91	24.48	27.12	31.40	22.22	25.09	25.21	24.35	25.17	23.08	22.41	22.20	24.64	22.20	31.40
10	22.65	29.16	27.16	31.40	23.48	24.46	22.87	24.13	23.39	23.28	23.52	26.32	25.15	22.65	31.40
11	20.43	27.48	24.72	28.60	21.29	24.05	27.09	24.13	22.30	23.67	23.91	21.17	24.07	20.43	28.60
12	19.83	26.68	22.48	26.80	22.30	27.15	24.61	27.74	23.22	23.13	25.96	22.42	24.36	19.83	27.74
13	22.83	25.72	25.36	28.04	24.63	23.00	24.33	24.13	25.75	25.36	29.00	21.10	24.94	21.10	29.00
14	22.29	27.92	21.92	24.36	22.96	23.04	24.08	20.00	23.21	24.08	24.35	24.30	23.54	20.00	27.92
15	26.75	24.64	21.44	26.72	25.08	24.70	27.75	22.74	23.00	22.12	22.55	26.12	24.47	21.44	27.75
16	22.04	28.72	25.96	27.54	23.48	23.30	29.21	21.04	22.71	19.87	26.00	24.24	24.51	19.87	29.21
17	23.91	29.76	26.84	28.84	21.65	25.63	23.96	22.88	21.83	20.84	24.78	26.92	24.82	20.84	29.76
18	22.17	29.60	24.08	27.12	26.30	23.52	25.91	20.42	19.71	22.78	22.48	24.87	24.86	19.71	29.60
19	25.96	31.00	23.88	29.12	24.65	25.05	27.50	21.65	21.04	22.17	25.13	21.08	24.85	21.04	31.00
20	24.32	30.20	23.56	24.72	24.87	25.57	27.09	22.00	25.50	21.08	24.43	22.87	24.68	21.08	30.20
21	20.60	26.28	24.92	25.72	24.18	24.09	27.08	21.48	23.08	24.67	25.22	20.09	23.95	20.09	27.08
22	24.76	27.42	27.04	24.50	26.22	24.48	27.67	23.52	22.29	25.73	25.22	26.39	25.44	22.29	27.67
23	21.80	26.88	30.08	24.00	21.52	23.61	23.42	22.83	24.40	20.91	23.23	25.78	24.04	20.91	30.08
24	25.96	29.12	27.08	22.28	26.50	22.79	21.95	24.54	24.58	21.13	26.17	19.96	24.34	19.96	29.12
25	23.74	23.16	28.64	22.00	25.00	26.21	25.14	21.96	23.09	21.68	25.13	25.24	24.25	21.68	28.64
26	23.04	24.68	27.60	21.48	20.55	24.57	25.90	22.50	25.56	20.91	24.26	30.14	24.27	20.55	30.14
27	24.46	23.50	29.64	25.75	23.70	23.43	26.14	23.91	24.33	23.78	25.35	30.13	25.34	23.43	30.13
28	23.91	31.92	26.40	20.32	23.58	23.33	23.46	24.55	22.38	24.65	28.30	25.32	24.84	20.32	31.92
29	25.79	29.57	24.52	25.12	24.68	21.44	23.95	26.14	20.72	25.78	22.27	21.96	24.33	20.72	29.57
30	26.75		30.29	23.63	22.21	23.48	26.29	22.68	20.96	25.17	25.23	20.48	24.29	20.48	30.29
31	25.91		25.76		22.75		24.61	24.83		26.58		26.78	25.32	22.75	26.78
Average	23.79	27.35	26.77	26.06	23.67	24.07	25.08	23.45	23.36	23.10	24.89	24.01	Media	19.40	32.44
Min	19.83	23.16	21.44	20.32	19.48	21.44	20.83	20.00	20.42	19.40	21.96	19.96	23.52		
Max	26.75	31.92	32.44	31.40	28.44	27.15	29.21	27.74	28.79	26.58	29.00	30.14	25.63		

Table 5: Trend of Temperature of Taviano in Jan-Feb-Mar and Jun-Jul-Aug

Year	Jan	Feb	Mar	Jun	Jul	Aug
2014	11.40	12.50	11.74	24.58	25.74	26.52
2013	9.55	8.82	12.40	23.87	26.55	27.87
2012	7.22	4.43	12.03	25.32	28.16	27.37
2011	8.42	9.05	11.11	24.52	26.26	26.87
2010	9.85	10.64	10.17	22.52	25.83	25.23
2009	9.77	7.70	10.65	23.25	25.66	26.39
2008	9.54	8.92	11.93	24.15	26.69	26.87
2007	10.35	10.63	11.62	24.15	26.46	27.19
2006	6.59	9.23	10.79	22.08	24.91	24.52
2005	7.95	7.28	10.25	22.75	26.70	23.97
2004	7.74	8.76	10.41	22.62	25.23	25.14
2003	10.58	5.86	9.70	26.16	27.37	27.87
2002	6.40	11.80	12.50	23.60	26.90	25.90
2001	11.25	9.83	14.80	22.40	25.91	26.62
2000	6.82	8.44	10.65	24.03	24.98	26.55
1999	8.24	8.09	11.44	23.83	25.44	27.10
1998	9.44	10.77	9.44	24.82	27.57	27.35
1997	10.31	9.91	11.28	24.71	25.82	25.20
1996	9.58	8.39	9.71	24.46	25.72	24.95
1995	8.62	11.31	10.53	24.41	27.44	24.52
1994	10.05	9.73	11.87	22.02	26.87	27.65
1993	8.07	6.50	9.05	22.95	24.84	26.45
1992	7.76	7.47	10.27	22.02	24.16	27.24
1991	7.89	8.57	12.82	22.43	24.97	25.31
1990	7.47	9.62	12.54	23.26	26.00	25.11
Average 1990-2014	8.83	8.97	11.19	23.64	26.09	26.23

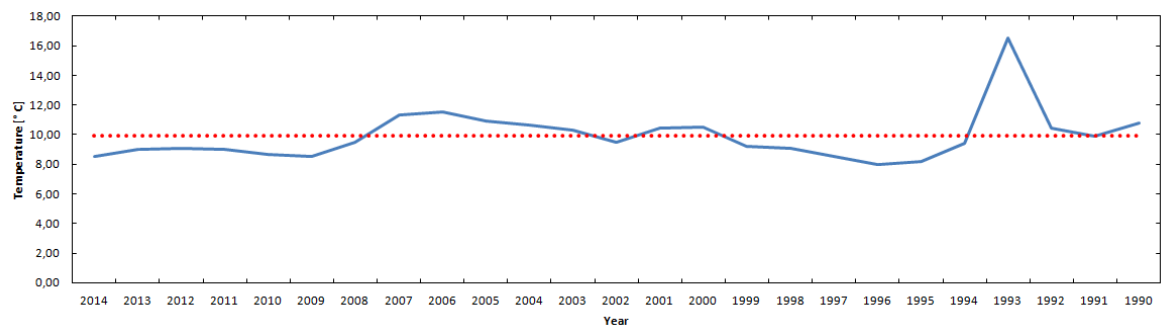


Figure 3: Day time and night time variations (solid line) and Average Day time and Night time variations 1990-2014 (dotted line)

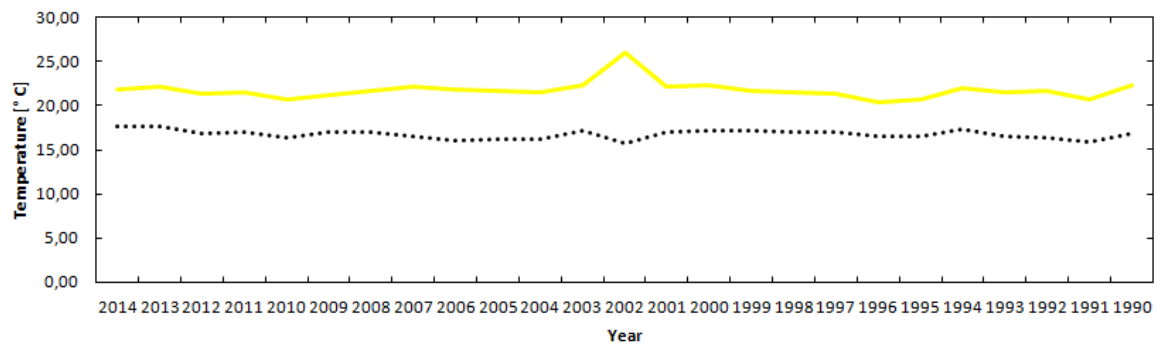


Figure 4: Maximum Temperature (solid line) and Average Temperature Variations 1990-2014 (dotted line)

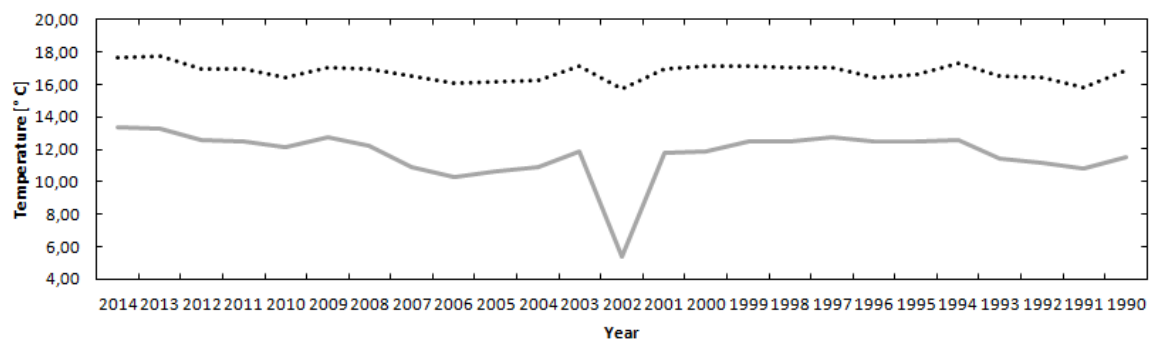


Figure 5: Minimum Temperature (solid line) and Average Temperature Variations 1990-2014 (dotted line)

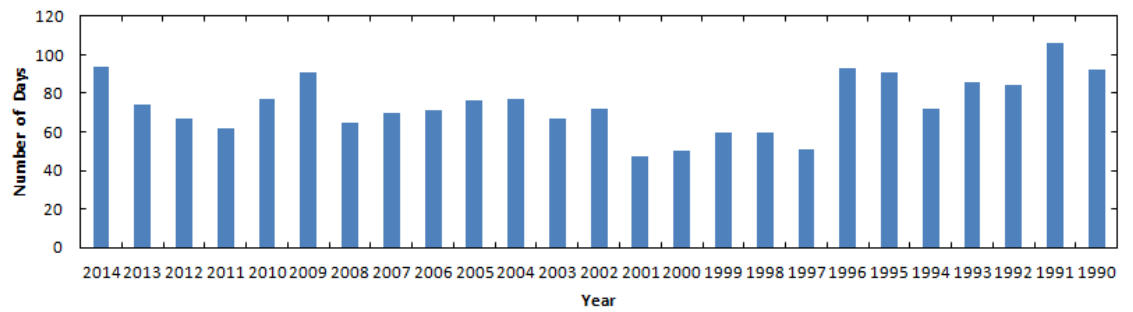


Figure 6: Total Days of Rain by Year

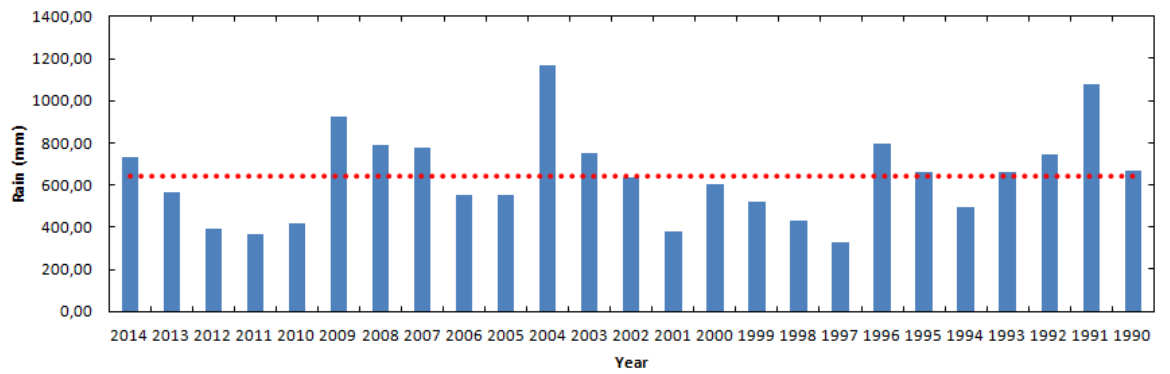


Figure 7: Total rain [mm] by year - (Dotted line is Average from 1990 to 2014)

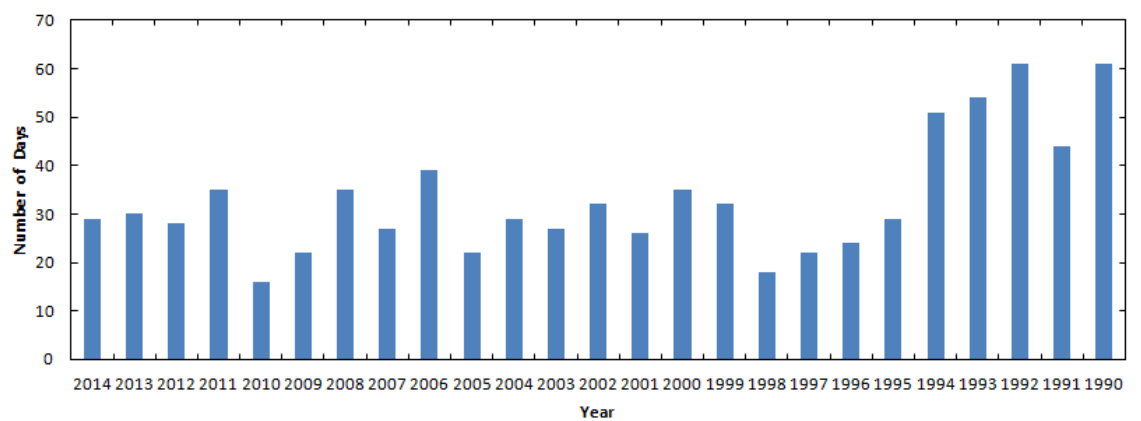


Figure 8: Total day of Fog by year

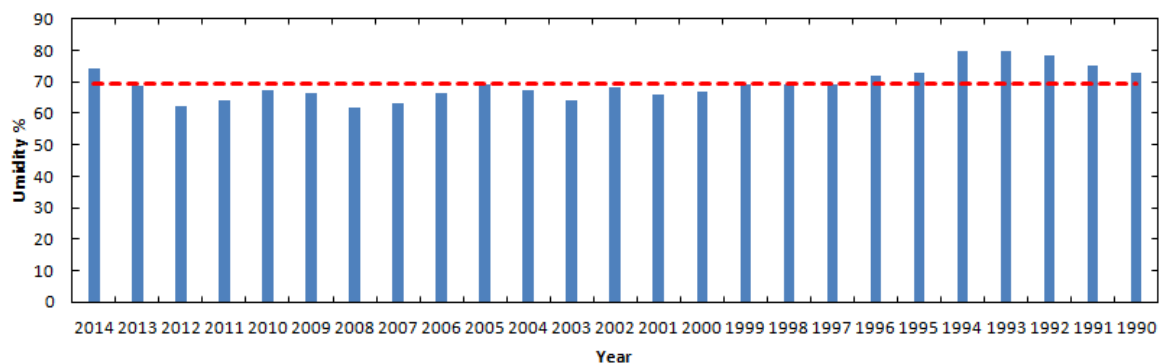


Figure 9: Humidity (solid line) and Average Humidity Variations 1990-2014 (dotted line)

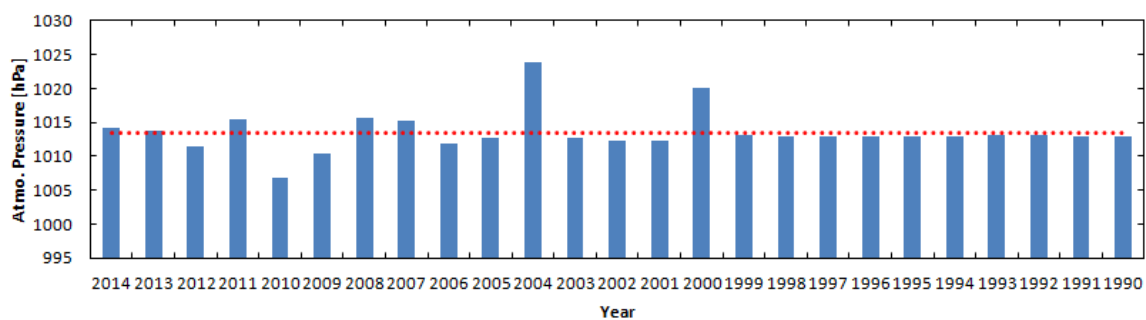


Figure 10: Pressure (solid line) and Average Pressure Variations 1990-2014 (dotted line)

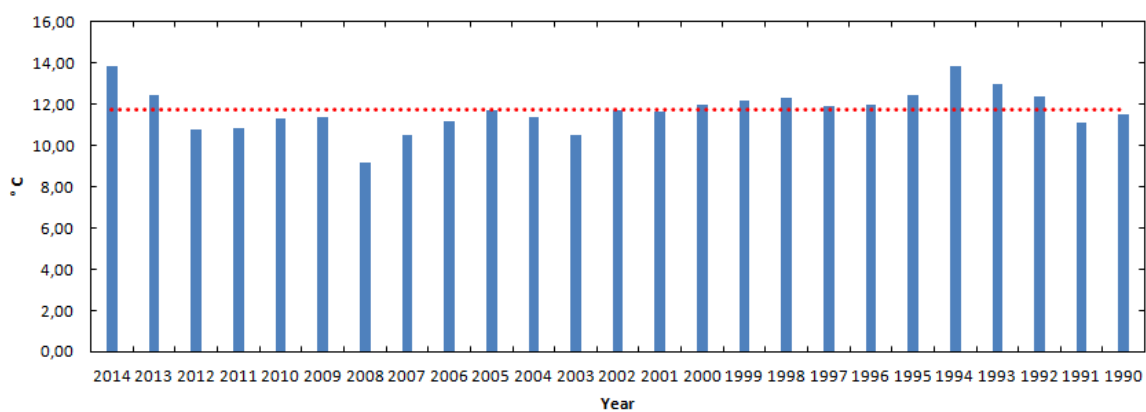


Figure 11: Dew Point (solid line) and Average Dew Point Variations 1990-2014 (dotted line)

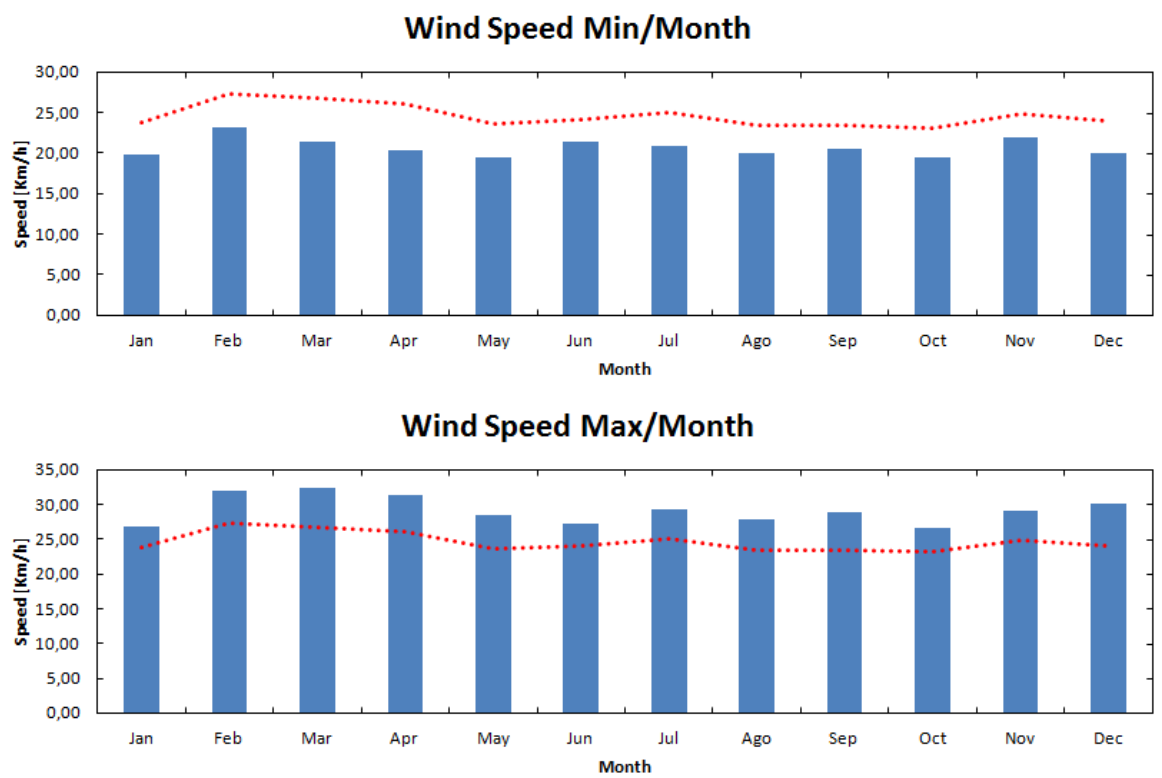


Figure 12: Wind Speed (solid line) and Average Wind Speed Variations 1990-2014 (dotted line)

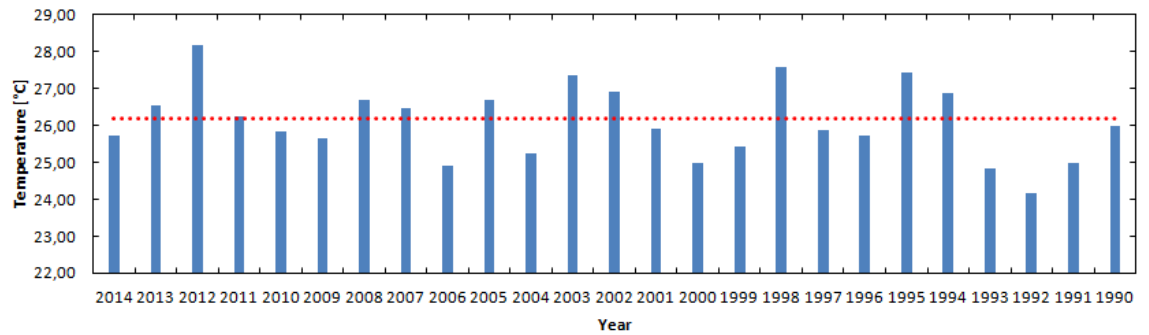


Figure 13: July Temperature (solid line) and Average August Temperature 1990-2014 (dotted line)

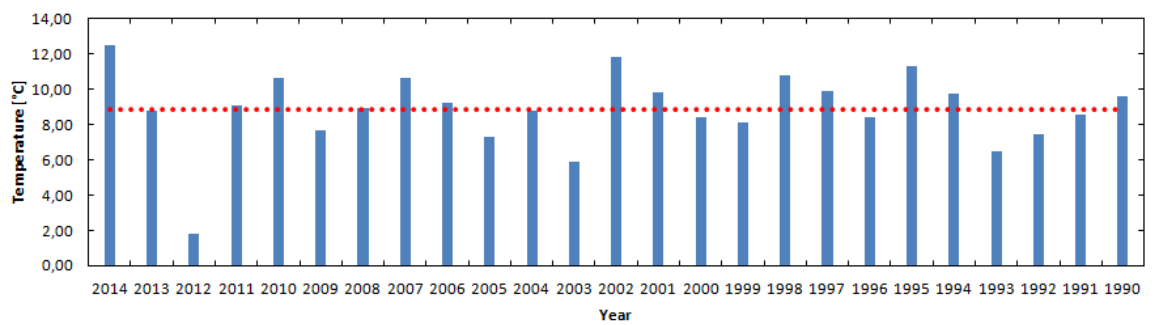


Figure 14: February Temperature (solid line) and Average February Temperature 1990-2014 (dotted line)

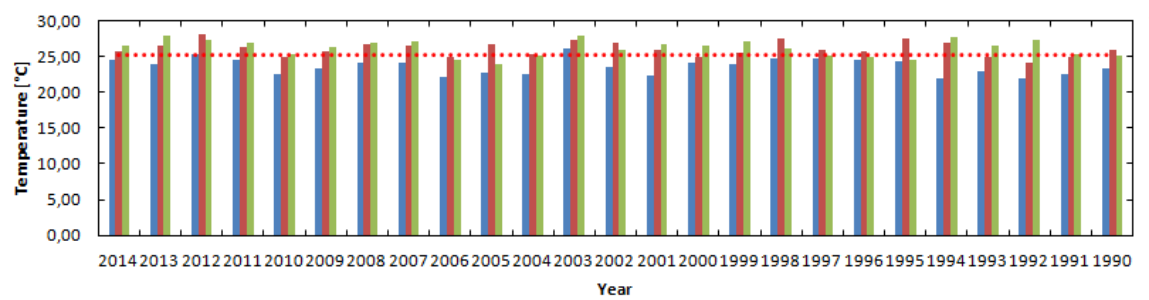


Figure 15: Summer Temperature (solid line) and Average Temperature Variations 1990-2014 (dotted line). Jun: blu, Jul: red Aug: green

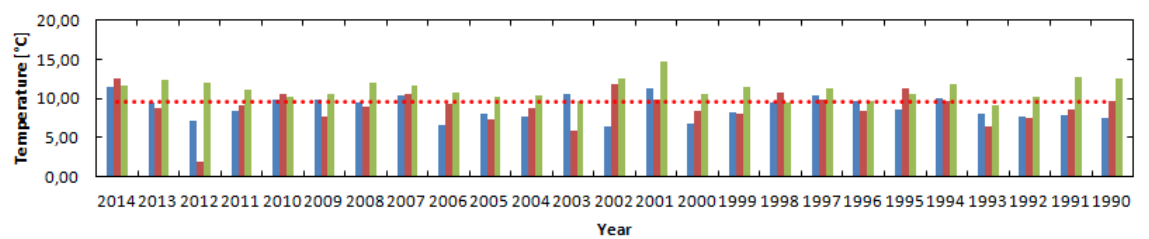


Figure 16: Winner Temperature (solid line) and Average Temperature Variations 1990-2014 (dotted line) Jan: blu, Feb: red Mar: green

Figure 17: Total Rain (mm) by Month

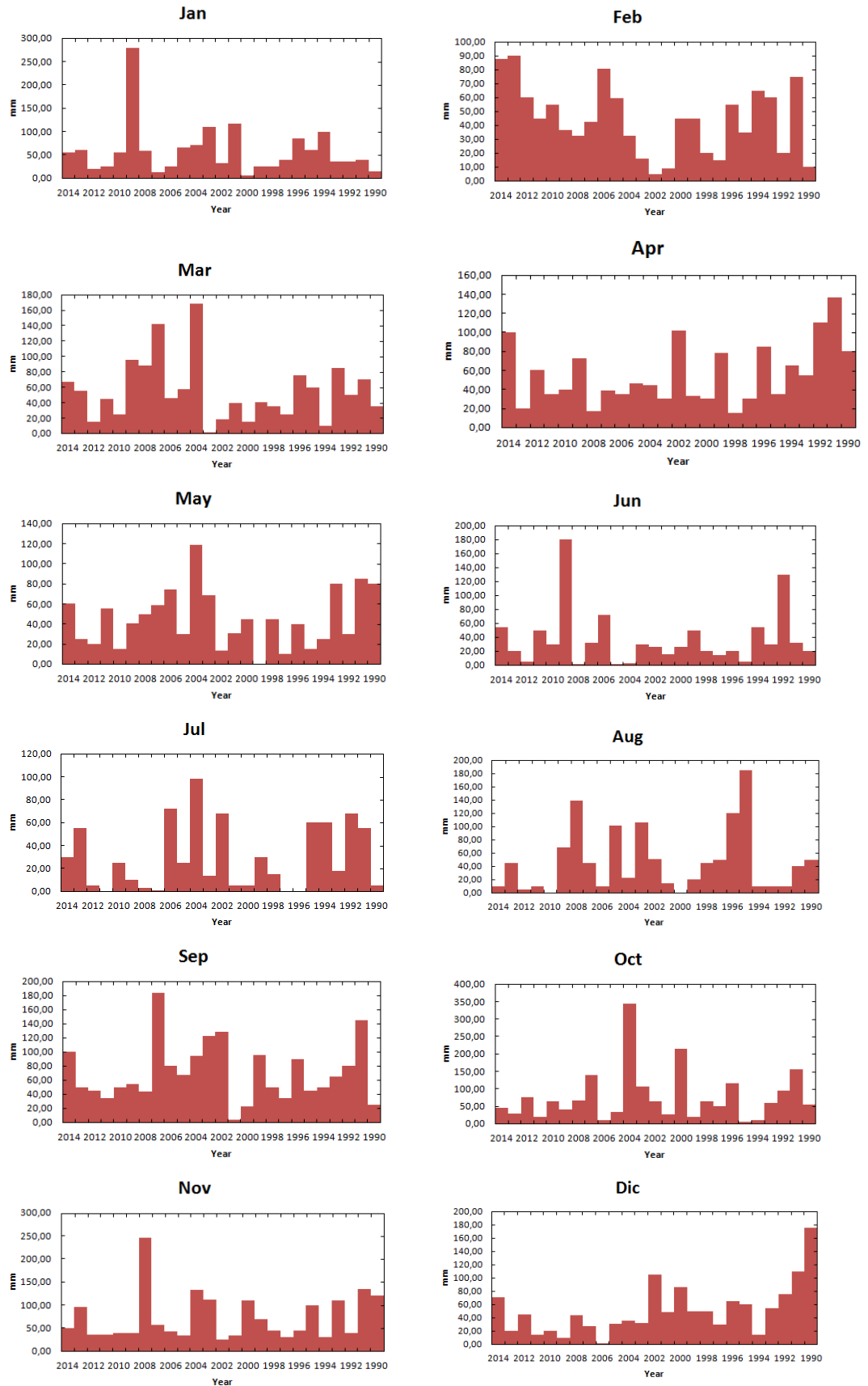
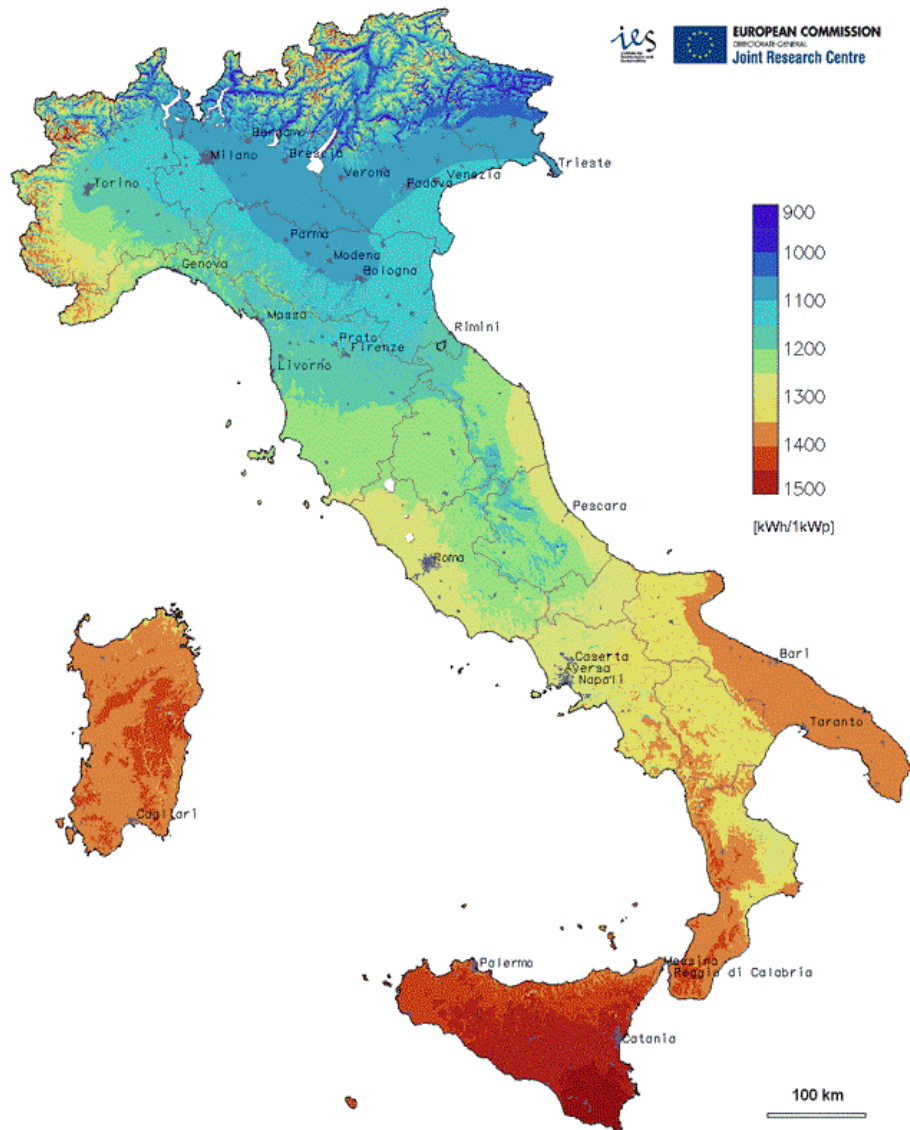


Figure 18: Solar Irradiation Map [8]



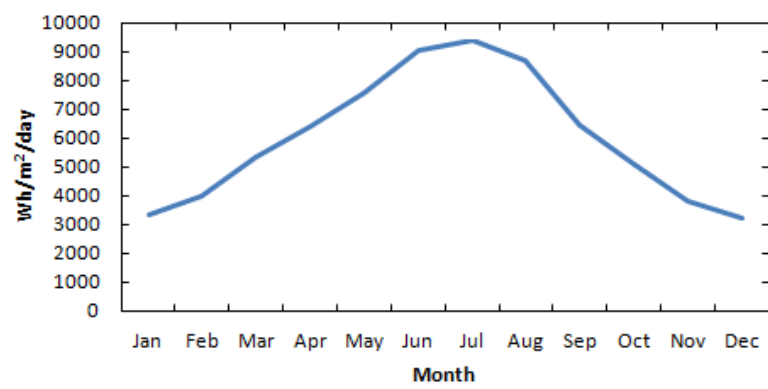


Figure 19: DNI Direct Normal Irradiance (Wh/m²/day)

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